NOT FOR PUBLICATION UNTIL RELEASED BY THE
HOUSE ARMED SERVICES COMMITTEE
HOUSE OF REPRESENTATIVES

STATEMENT BY

THE HONORABLE DUANE P. ANDREWS

ASSISTANT SECRETARY OF DEFENSE

(COMMAND, CONTROL, COMMUNICATIONS

AND INTELLIGENCE)

BEFORE

HOUSE ARMED SERVICES COMMITTEE

READINESS SUBCOMMITTEE

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Mr. Chairman and members of the subcommittee, I appreciate this opportunity to appear before you today to discuss Corporate Information Management (CIM) in the Department of Defense. I will describe our recent progress, and Mr. Paul Strassmann, my Director of Defense Information, will discuss our plans for this key initiative and address the ways in which information management will continue improving the effectiveness and efficiency of the Department.

The CIM initiative was established to reduce non-value added work and costs, as highlighted by the July 1989 Defense Management Report (DMR) to the President. CIM is one of our important management methods for achieving DMR cost reductions while maintaining or improving the effectiveness of DoD military missions. The primary objective of CIM is business process improvement. This is where the major benefits of implementing CIM will be achieved. The role of information technology is supportive and allows the adoption of more efficient and effective business area management practices.

Improved information management acts as an enabler for many DMR initiatives and their associated cost savings. This

includes initiatives such as reducing supply system costs, consolidation of supply depots, consolidation of financial operations, stock funding of reparables, reducing transportation costs, and better management of Defense Agencies.

DoD recognizes that information must be managed, just as capital, materiel, and people must be managed, to improve effectiveness and efficiency of operations. We will use improvements in our information management to improve the accuracy of our inventories, to speed their distribution, and to eliminate unnecessary steps in the warehousing process. Our information management improvements will leverage cost reductions and operational efficiencies throughout our operations, from command and control to payroll. CIM represents a dramatic change in the way DoD sees its business functions and uses information.

Central to the concepts of CIM is that DoD's information management decisions must be made on a business case basis. By this we mean we will maintain or improve the quality of a product or service while we minimize our total expenses for conducting that particular business function. These expenses include labor, materials, and any proposed or existing information system. We will look at alternative ways of performing that function, contract payment for example, and information systems will be considered only when justified by the total business case.

Computing and communications technology are to play a subordinate but important role. A technology base of open system architectures and standardized data will be emphasized. This will allow systems developers to concentrate on software that will be more responsive to the needs of DoD users, such as paying our soldiers, maintaining their medical records, or requisitioning their supplies. Our systems developers will be able to focus on software improvements and use jointly shared technologies, such as those developed through research at DoD's Software Engineering Institute, to make these improvements.

Our initial estimates of net savings in information technology attributable to the CIM initiative for FY 1991 through FY 1995 total about $2 billion. This amount has already been removed from the DoD budget. We based this estimate on the budget data submitted from the Military Departments and Defense Agencies for the FY 1991 budget review. This estimate is based on information technology savings only. The estimate does not reflect the larger role that improved information management plays by improving business processes and decisions on operational methods.

Following the internal DoD management decisions to reduce our information technology budget in anticipation of CIM savings, the Congress took additional actions to reduce DoD's FY 1991 information technology development and modernization funds by almost 30 percent and centralize the remaining

$1 billion in a CIM Transfer Fund. This significant funding reduction and the mechanics of reallocating FY 1991 funds from the CIM Transfer Fund have caused adverse impacts and resulted in some negative reaction towards CIM in those operational mission activities that lost legitimate support. The review and subsequent complex allocation process continues to delay the receipt of FY 1991 funding by the Component information system program managers. This has created some unfortunate breakage in the Components' acquisition programs, as has been the case with at least one major logistics information system. Coming on the heels of the large reduction in DoD's development and modernization funding, the delays caused by the red tape of a central transfer fund have introduced obstacles to implementing CIM and responding to mission needs. I assure you that we are setting up a strong information management program within the Department that will ensure central oversight and review of information system modernization activities while still allowing the Components to budget for, and execute, these programs and reap the programs' benefits in their operations.

Responsibility for the CIM initiative was recently assigned to me by the Secretary of Defense. He has charged me with ensuring the proper integration of Defense computing, telecommunications, and information management activities. In line with these responsibilities, we are establishing an organization and policy base to implement Corporate Information Management throughout the Department. Last month, I established

in my organization the position of Director of Defense Information, and appointed Mr. Strassmann to serve in this Principal Deputy Assistant Secretary of Defense level job. Mr. Strassmann and his staff will have overall responsibility for implementing the CIM program across the Department. This will include the development and implementation of information management policies, programs and standards and the integration of the principles of information management into all of the Department's functional activities.

I also serve as the Department's Senior Information Resources Management (IRM) Official. My Deputy Assistant Secretary of Defense for Information Systems, Ms. Cynthia Kendall, supports me in this area. Review and oversight of automated information systems will continue under the Major Automated Information Systems Review Council (MAISRC). In addition, our plans are to expand oversight to include information services in order to improve effectiveness and efficiency.

Today, I will discuss DoD's plan for carrying out CIM as a Departmentwide strategy, and also I will give the background for the plan.

PROGRESS TO DATE

Only 18 months ago, the Deputy Secretary of Defense announced our initiative on Corporate Information Management (CIM) to ensure more effective management for and use of DoD's information. CIM is one of the major strategic initiatives identified as a result of the Secretary's July 1989 Defense Management Report to the President. The Deputy Secretary directed that DoD examine successes in improving effectiveness and efficiency in industry, suggesting that these same successes could be achieved in the Department. He also directed that DoD should move towards systems and software that support joint needs. Most importantly, he called for improvements in information management to realize savings both in the $9 billion spent annually by the Department on information technology and, more importantly, in the billions more spent on associated business areas.

Two primary vehicles were initially established to carry out the CIM initiative. The first was an Executive Level Group (ELG), a Federal Advisory Committee made up of six experts from the private sector and three DoD officials. In addition to myself, Mr. Sean O'Keefe, the DoD Comptroller, and Dr. David Chu, the Assistant Secretary of Defense for Program Analysis and Evaluation, represented the Department on the ELG. The role of the ELG was to recommend an overall information management approach and an action plan to enhance the availability and standardization of information in common areas for the DoD. I

do not believe we could have accomplished this important task without the vision of our external members, who were led by Mr. David Hill, the Chief Information Officer of General Motors.

I would like to note here that throughout the initial year of analysis and study for CIM, the Comptroller had primary responsibility for the initiative. He and his staff deserve much credit for carrying this effort forward, which included many approaches never tried before within the Department. Major among these was the convening of experts from across the Department to concentrate on functional reviews of business processes from a DoD-wide rather than Service-unique point of view. These initial functional groups formed the other portion of CIM, as established by Mr. Atwood in October 1989.

The first of these functional working groups was convened in December 1989. Altogether, eight groups are currently in session. They cover civilian payroll, distribution centers, financial operations, government furnished material, civilian personnel, medical, materiel management, and contract payment.

Among the valuable lessons learned from these groups is the criticality of functional area leadership in information management decision making. Functional leadership assures that business process change drives improvements, including those related to information systems development. Strong support and commitment from the highest level of functional leadership is evidenced by the fact that the Assistant Secretary of Defense

for each functional area chairs their respective Functional Steering Committee. For example, the DoD Comptroller chairs the Functional Steering Committee overseeing financial management working groups, which includes civilian payroll, financial operations, government furnished material and contract payment. In addition to providing the highest level of policy direction to the work of each functional group, the leadership has the authority to implement the policy decisions that must be made to foster better information management within that area.

CIM PLANS

The ELG submitted its plan to the Deputy Secretary of Defense in early fall of 1990. The Secretary of Defense endorsed the plan on November 16, 1990 and put into motion a series of actions to carry out the plan. Among these was designation of my office for leadership of CIM, reassignment of the supporting IRM staff to me, and the requirement to prepare a plan for implementation of CIM principles across the Department. Also, because of my expanded responsibilities, including the CIM initiative, I now report directly to the Deputy Secretary and Secretary of Defense.

The Deputy Secretary of Defense in January 1991 approved our Plan for Implementation of CIM in DoD. This plan establishes a management process allowing for centralized information

management policy making and decentralized information program execution by the Components of the Defense Department.

Responsibility to develop policy for the effective and efficient development and operation of all automated data processing equipment in the Department of Defense has been consolidated in my staff. The only exception involves equipment and software which is an integral part of a weapon or weapons system or related test equipment, for which policy responsibility will remain with the weapons systems acquisition community.

We are creating a new Center for Information Management within the Defense Communications Agency to provide technical support and assist us and the DoD Components in execution of our information management programs. The Center will perform functions such as supporting the functional groups, developing DoD architectures, assisting in the production of process and data models, and supporting the development of information management standards. These changes are significant enough that we are renaming DCA the Defense Information Systems Agency.

In conjunction with the DoD Comptroller, we will develop a comprehensive plan for the evolutionary transition of the Department's data processing operations to a fee-for-service basis. This will provide all levels of functional and information managers with vital insight into the cost and value

of their information technology support and will facilitate decision making on a business case basis.

These improvements are aimed at specific goals for the future, such as making common business systems the norm rather than the exception and providing a computing and communications infrastructure transparent to the information systems that rely upon it. To meet these goals and our vision of the future, the Executive Level Group identified major strategies, which have been approved by the Deputy Secretary of Defense as a basis for formulating further CIM plans. Some of these strategies are as follows:

PROCESS MODELS

We must look for improved ways of doing business in the DoD; we need to simplify business processes before we automate. Early emphasis will be placed on documenting new and existing business methods throughout the Department's major functional areas. This will be accomplished to be sure that functional improvements truly drive all of our future information systems decisions.

A process model is a way to represent a business method. For example, we can use a process model to describe our methods for maintaining inventories and determining reorder levels. We can then examine these methods and look for ways of improving them, measuring the methods against an exemplary private

industry program as a benchmark. Likewise, we can compare the methods used by different DoD Components.

The use of process models is one way we will determine cross-Service methodologies and move to joint programs while maintaining or improving quality of support to any given organizational element.

COMMON INFORMATION SYSTEMS

Work is progressing towards our goal of developing and implementing a set of cost-effective, common information systems based upon process models and data standards. Development of Functional Information Management plans, to coordinate information systems directions and developments across the functional areas of the Department, will provide the basis to identify where common systems can be employed and when systems should be unique. This is a high-priority area, and we are backing this up by designating high-level Functional Information Managers, who report directly to Mr. Strassmann and work with senior functional management, such as the chairs of the Functional Steering Committees.

LIFE-CYCLE MANAGEMENT METHODOLOGY

Strengthening this cornerstone of information management policy will further the implementation of CIM principles in the automated information system development process. We will build upon our existing life-cycle management methodology to include

process models, data models, updated system development and acquisition methodologies that employ evolutionary approaches, and we will educate the user and technical communities in its use.

EDUCATION

We must educate Department personnel in the concepts of CIM and the plans to apply it. The Information Resources Management College of the National Defense University is the leader in meeting the Department's education needs in this area. We will move quickly to establish and implement education programs to instill knowledge of information management and to support all DoD Components. The IRM College is also taking the CIM and oversight message to field installations through its Paul Revere program, which delivers education on policy updates to the very organizations that must implement those policies to make information management improvements successful.

CURRENT STATUS

The Department continues to place strong and active emphasis upon our oversight role. In this regard, the Major Automated Information Systems Review Council (MAISRC) now operates independently of the Defense Acquisition Board (DAB). The MAISRC membership has been expanded to include a representative from the Joint Staff, who will assure that system

interoperability and deployment factors are given appropriate consideration, and a representative from Developmental Test and Evaluation organizations. The DoD Comptroller remains a member and provides valuable contributions from a financial management perspective.

While being examined for potential improvements, DoD's life-cycle management policies remain strong. Automated information systems, including those systems being developed or improved as part of the CIM initiative, will continue to be subject to these life-cycle management policies.

In addition, we have updated the reporting guidance for our major system quarterly reports and aligned the DoD information technology budget reporting format to provide expanded oversight information.

We are now formulating program plans to execute information management throughout the Department. Throughout our plans, we are emphasizing incremental and evolutionary change rather than organizational upheaval. For example, we must consider the impact that our plans will have on our existing base of personnel, facilities, and networks. As we move to a more integrated computer and communications environment, we will emphasize the retraining of our people whose skills need to be broadened or updated so that they may work with more efficient systems development tools. Also, to identify our key information managers and to provide education and career

opportunities for our people with the potential to become key information managers, we are continuing our efforts with the Office of Personnel Management for the designation of a distinct job classification and series.

SUMMARY

The Department is providing strong leadership and sending a strong and consistent signal in the CIM initiative. In anticipation of cost reductions, money has already been removed from DoD's budget. DoD is not just cutting funding -- more importantly, we are putting in place the ability to provide the same or better level of service and response at these lower funding levels.

As I have described it, integrating information management across the Department is a long-term challenge. Examining and improving the many information management activities of the Department will be a process of continuing evolutionary improvement. However, these improvements are integral to the Department's ability to maintain critical capabilities while downsizing.

The success of CIM hinges in large part on the ability to standardize processes and data and to install an open systems architecture as we move the Department into an era emphasizing information management. This is a strategic move and will take

several years before execution is completed. Your continued support for CIM and these related activities will go a long way towards making CIM a success.

To give you a better idea of specific progress we have made and expect to make, Mr. Strassmann will provide some examples of business process improvements and discuss our plans for the future.

We solicit the subcommittee's support for our efforts to improve information management, which is a key to improving the overall accomplishment of DoD's mission.

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OPENING REMARKS:

Mr. Chairman and members of the subcommittee, it is a privilege to report to you on the current status of the Corporate Information Management (CIM) initiative of the Department of Defense (DoD).

In terms of expense, the CIM initiative is the largest information management program ever conceived by any U.S. business organization. In terms of schedule, it will require every moment of the 5-year period for which savings were initially targeted. CIM calls for a major reengineering and restructuring of business methods and administrative processes in DoD.

The immediate CIM goals are set by the Defense Management Report (DMR) initiatives. Each of the top three DMR cost reduction targets exceeds the annual information management budgets for the top three U.S. manufacturing companies. A significant percentage of DMR cost reductions will be accomplished as a result of the CIM initiative. As Mr. Andrews pointed out, we are now concentrating on improving information management in selected administrative areas, such as contract

payment, civilian payroll, distribution centers, and medical applications. We are also setting the foundation for applying CIM information management methods to all other DoD business areas.

We have chosen information technology as one of the tools to achieve DMR results. Our objective is to shorten the time for delivery of new computer applications by 75 percent while simultaneously realizing savings in excess of $6.0 billion in information technology through fiscal year 1997. This includes savings through reductions in systems development costs, sharing of computer software, consolidation of systems engineering design centers, and simplifying operations of data and design centers. The information technology savings also include gains from the Computer-aided Acquisition and Logistics Support (CALS) initiative and the Electronic Data Interchange (EDI) initiative for paperless processing of business transactions.

Let me emphasize, however, that CIM should not be seen as an information technology program. Although it is expected to deliver in excess of $6.0 billion of savings in information technology, CIM succeeds only insofar as it supports all DMR targets. Information technology should be seen only as the rails on which the DMR freight train can roll to deliver its results!

Even the most ambitious initiatives can succeed only by making steady progress, one step at a time. Therefore, I shall

dispense with generalities and concentrate on examples of what CIM has already accomplished. After that, I shall discuss immediate steps we are taking to make sure CIM ultimately delivers what is expected.

A. ILLUSTRATIVE EXAMPLES OF CIM RESULTS:

1. THEATER MEDICAL AUTOMATION

The start of Operation Desert Shield found the Department without the necessary medical information system capabilities to support a major joint theater operation. The medical functional group provided joint automation support for Desert Storm. This included the Theater Army Medical Management Information System, Defense Medical Regulating Information System, and Automated Patient Evacuation System. Each of these systems had to be adapted to function as an integral part of a joint theater medical operation.

The four Services began immediate implementation of required support. By November 1990, essential automation support was being provided to medical regulating, patient administration, patient evacuation, and medical logistics operations. By the start of Operation Desert Storm, this support was being provided from the Central Command theater of operations, through Europe, and into the support base in the continental United States. Throughout the Operation, the medical group worked closely with the Joint Staff, both theater commands, and the Services to provide the necessary support.

By April 1991, these automation initiatives supported 10,000 patients and tracked the movement of over $200 million in medical supplies in theater. In providing this support, time for a patient regulating request was reduced from 20 minutes to 30 seconds.

Altogether, twelve standard systems have been designated to serve medical information-handling needs of DoD Components.

2. LOGISTIC SYSTEMS

We have selected a number of current, wholesale logistic systems as candidate DoD standards. In the future, we anticipate the functional requirements represented by a large number of existing information systems in the materiel management area will be met by fewer redesigned systems. This will require considerable additional planning and analysis, but we expect substantial returns.

3. CIVILIAN PERSONNEL SYSTEMS

For the civilian personnel function, we have selected a single system - the Air Force Civilian Personnel Data System - to support 94 percent of DoD employees.

4. FINANCIAL OPERATIONS SYSTEMS

The CIM process is instrumental in enabling the Defense Finance and Accounting Service (DFAS) to consolidate diverse financial operations. DFAS is now working jointly with the

civilian payroll group to specify how the DoD payroll business shall be conducted.

The CIM functional groups are currently evaluating Army's travel module for deployment by the Air Force and are also evaluating the potential of adopting Army's Program and Budget System for deployment by the Defense Logistics Agency (DLA) and the Air Force.

The subcommittee should be aware that unification and consolidation of administrative systems is not a simple technical matter. For instance, the civilian payroll group has identified many procedural differences in current business practices among DoD Components:

-- how to calculate pay after expiration of a temporary appointment;

-- how to deliver leave and earning statements (mailing versus hand-delivery);

-- how to document time and attendance and labor accounting (extensions computed in the payroll system versus outside the payroll system);

-- how to address payment versus use of compensatory time; and

-- how to define a standard pay period. (The Military Departments use the same pay period and DLA uses an alternate pay period.)

The above may appear to be minor procedural matters. However, accumulation of such diversity makes it mandatory to change business practices and reorient people prior to attempting a systems consolidation that has a chance of succeeding.

Precipitous consolidations without consideration of human and procedural complexities have resulted in well documented administrative disasters. We shall avoid taking such risks. We shall specify improved business methods before proceeding with any standardization.

B. MEASURES TO ASSURE CIM PROGRAM RESULTS:

1. MEASUREMENT OF EFFECTIVENESS AND EFFICIENCY

The Department is now installing an aggressive approach to measure effectiveness of individual CIM initiatives. In each case, we shall ask for expected financial results and for operating measures prior to approving full implementation. The program manager will show expected cash flow, adjusted for risk and for the time value of money. This approach follows industrial practices of business analysis in justifying productivity improvement projects.

To make comparisons between different implementation alternatives, we have delivered to the Contract Payment CIM group a computerized procedure for financial evaluations. This approach will assure consistency of planning, provide a method for full disclosure of operating assumptions, and allow for quarterly audit of actual accomplishments.

We require CIM program managers to compare their projected unit costs, order-handling delays, and transaction errors with comparable private sector business practices. For example, in the case of handling purchase orders for low cost items, the Materiel Management CIM manager will examine purchasing practices of the most efficient U.S. firms. The CIM method requires performing value-engineering on individual transactions to find out how to revise existing DoD business policies and practices.

We expect most of the projected CIM savings will result from change in business methods and revision in DoD policies rather than from more efficient computerization. There is no point in having a computer do something faster if it should not be done at all!

2. MEASURING RESULTS OF THE CIM PROGRAM

Timely delivery of cost reductions specified in the Defense Management Report initiatives - without impairing effectiveness of our Armed Forces - shall be used as the proof that the CIM

program is effective. We have decided to couple CIM activities to implementation of DMR initiatives. The CIM approach to streamlining all DoD business methods and eliminating unnecessary information activities becomes the means for delivering the initiatives' results. This is why the scope of CIM covers streamlining of all DoD information work, which includes personnel, materiel, logistics, finance, and planning.

3. ROLE OF COMPUTERS IN CIM

A relatively small share of total DMR savings will accrue from simplification and standardization of information technology. Benefits from streamlining DoD's automatic data processing activities will become visible as we monitor results from technology programs just as we track all other CIM programs.

Improvements in responsiveness of organizations managing computers are essential for achieving CIM cost reduction targets while improving effectiveness of defense support operations.

4. MEASURING VALUE OF INFORMATION

Analysts studying the competitiveness of U.S. industry discovered a prevailing neglect in managing "indirect" costs, also identified as "overhead" expenditures. The value of a tank, fighter airplane, or cruiser can be evaluated, because they represent tangible military power. The value of information-handling procedures is much harder to assess,

because these costs are incurred on the basis of custom, procedure, regulation, and organization.

Industry has attacked the problem of overhead cost control through "activity-based" accounting. In this approach, indirect support costs are attributed to operating results.

We have embarked on a vigorous program to associate overhead support activities with tangible operating results. The first target for the new approach is information technology. Information services provided by large DoD data and software design centers will be placed on a fee-for-service basis. Data center and design center budgets will be determined by demand from DoD customers and not by budget allocation which cannot achieve a fair balance between supply and demand for information services.

Since the electronic industry delivers annual cost/performance improvements in the 30 to 40 percent range, adoption of fee-for-service is a prerequisite for an economically sound approach to the expected modernization of computer centers that the CIM program requires. Fee-for-service makes it possible to establish a measure of actual computer center productivity gains.

Similarly, marked productivity gains that can be achieved by means of Computer-aided Systems Engineering (CASE) methods will permit evaluation of options for delivering software support to DoD Components. Fee-for-service for design centers

will make it possible to establish a measure of competitive excellence for software efforts.

5. DATA MANAGEMENT

For CIM to succeed, we shall eliminate unnecessary labor in transcribing, translating and reinterpreting the same data. Penalties for inconsistent and redundant handling of data are incurred primarily by clerical and administrative personnel. Poor data management practices show up as costly errors in the conduct of DoD business affairs, as excessive transaction costs, and as added management layers to monitor and control work.

The Executive Level Group stated all data in DoD should be entered into the information-handling system only once, with zero defects, so it could be reused as the information passes from its origin to its final use.

All DoD data definitions are now a shared "joint" asset, rather than belonging to individual information-handling systems. Data modeling and data control shall be under direct policy guidance of the office of the Director of Defense Information.

The subcommittee may be also interested to hear that we are not viewing CIM's data management program as an isolated DoD activity.

We are in the final process of reaching an agreement with the Veterans Administration on their participation in data

sharing aspects of the CIM program. They have identified information management savings if they can make direct use of DoD personnel and medical information when veterans transfer from DoD to the Veterans Administration.

DoD suppliers will also be affected by our Computer-aided Acquisition and Logistics Support (CALS) CIM initiative. CALS addresses timely and efficient handling of information that supports weapons and commercial products acquired by the DoD. Our purpose is to improve productivity within DoD as well as reduce the paperwork required of our suppliers. For instance, we developed methods and standards for electronic transmission of engineering drawings, technical manuals, and manufacturing documentation.

6. SPEEDING UP AND REDUCING COSTS OF INFORMATION TECHNOLOGY IMPLEMENTATION THROUGH STANDARDS

To simplify DoD business methods, we shall substitute automation for labor-intensive and error prone procedures whenever economically justifiable. The urgency of DMR targets makes it necessary to install new information technology on a schedule measured in months instead of years.

In June, I shall be joined by information technology executives from all DoD Components to announce DoD's unqualified commitment to implement a standard, vendor-independent, and readily upgradable information systems architecture. This

approach is generally known as the pursuit of "open systems" architecture.

No major U.S. corporation has as yet made such a full commitment, because "open systems" architecture is still debated in public, private, national, and international standards organizations. DoD cannot wait for vendors and customers to reach full agreement on every computer systems standard.

We shall proceed, without further delay, to construct all DoD information systems according to approved Federal Standards, as defined by the National Institute of Standards and Technology. We shall focus DoD resources on accelerated adoption of Federal Information Processing Standards (FIPS). We shall continue participating in international and industry standard organizations, after endorsement from the National Institute of Standards and Technology.

All information standards activities in DoD shall be under central coordination from the new Center for Information Management within the Defense Communications Agency and guided by policy from the Director of Defense Information.

7. SPEEDING UP AND REDUCING COSTS OF INFORMATION TECHNOLOGY THROUGH SYSTEMS ENGINEERING TOOLS

Prevailing methods for specification and development of new computer applications are labor-intensive and extremely error prone. They result in excessive life-cycle maintenance costs.

At present, the overwhelming majority of DoD programming resources is consumed in maintaining computer programs handcrafted more than a decade ago.

We shall select from a wide array of available tools a DoD standard set that will be applied to the manufacture of all new computer programs. Specification and selection of standard DoD software production tools will be guided by central policy from the Director of Defense Information. This approach will finally make it possible to realize the original intent of specifying the ADA computer language as a standard DoD programming language.

Implications of adopting a standard set of software engineering tools for DoD are far-reaching. The tools will safeguard interoperability of computer applications manufactured to the new standards. DoD's goal is to apply the standard toolset to reengineering and reuse of existing software. This will minimize conversion expenses while speeding up full implementation of CIM programs.

8. SPEEDING INTRODUCTION OF CIM PROGRAMS THROUGH REDUCTION OF RETRAINING DIFFICULTIES

Human factors - not information technology - are the pacesetters for the rate of progress through application of CIM methods. Evolutionary management methods and organizational learning will always be the most important ingredients in reaching DMR goals.

CIM calls for changed work habits. Rapid changes expected under CIM initiatives will require retraining of perhaps as many as one million DoD employees. Training will have to be continuous and personalized, because local conditions and individual skills will dictate the pace of change.

Information technology will play a major role as an ever present tutor, available to every person whenever they need on-the-job assistance. Existing information systems and information networks possess a confusing variety in appearance, procedure, and in visual perception. Therefore, they are not suitable as a means for understanding what needs to be done.

We shall proceed, as part of adopting Federal Information Processing Standards, to apply a standard graphic appearance to all new computer screens to make them suitable as training aids.

I thought members of the subcommittee would be particularly interested to hear about these important behavioral dimensions of the CIM effort. Management of the CIM program has been, is, and will always remain an endeavor that depends on people for its achievement.

C. CONCLUDING REMARKS:

Since 1955, I have managed many organizations in their quest to meet challenges of the electronic age. Although nothing in my experience - or anyone else's - compares with the

scope and demanding schedule of the CIM program, I am convinced that it shall succeed.

Our objectives are clear. The human resources at our disposal are equal or better than anything I have ever seen. The technical means are available. The need has never been greater.

As CIM evolves over the next several years, I am confident you will be pleased when you examine evidence of what has been accomplished.